THE INSTITUTE OF PHYSICS
47 BELGRAVE SQUARE, LONDON, S.W.1

BULLETIN

No. 18

Information in this circular is not intended for general publication: your copy should not therefore be passed to a library.

JUNE 1951

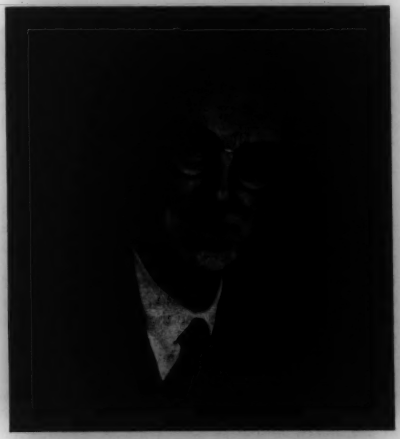
SALARIES AND CONDITIONS OF SERVICE

In this issue is published the report on the recent salary survey conducted among Members. Copies will be circulated to industrial employers, universities, government departments and other interested organizations. Additional reprints will shortly be available, on request, to Members.

The July issue of the BULLETIN will contain the revised notes on terms of engagement of physicists which have now been approved by the Board. Reprints will also be available.

MEMBERS OF THE BOARD

In the August, 1950, issue of the BULLETIN a photograph of the President, Professor Curtis, was reproduced and it is learned that Members would welcome a series of photographs of and brief biographical information about members of the Board and other prominent members of the Institute. In this issue of the BULLETIN is begun a series which it is hoped to continue in subsequent months.

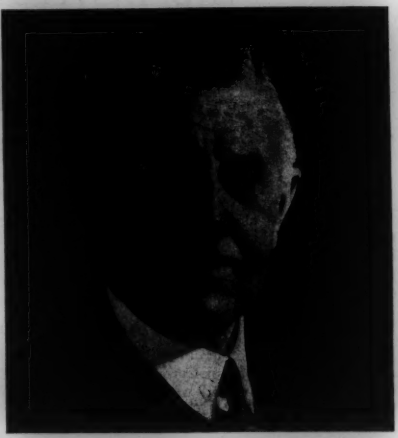


Arthur Mannering Tyndall, C.B.E., D.Sc., F.R.S. (*Past President*). Professor Tyndall was born in Bristol in 1881 and studied physics at what was then University College, Bristol, joining the staff of the Physics Department there in 1903. He has devoted the whole of his life to that department, being appointed Henry Overton Wills Professor of Physics in 1919. Largely by Professor Tyndall's stimulation, Mr. Henry Wills erected and endowed the Wills Physical Laboratory, of which Professor Tyndall was Director from its opening in 1927 until his retirement in 1948. During much of that time he carried out his own research on the mobility of ions, which is summarized in his monograph "Positive Ions in Gases," published by the Cambridge University Press in 1937. He also strove to create in his department a versatile centre of research and his success is measured by the high reputation which the Bristol school of physics now holds throughout the world.

In 1933, Professor Tyndall was elected to Fellowship of the Royal Society and he has served as a member of its Council and as a Vice-President. He represented the Royal Society on the Executive Committee of the National Physical Laboratory for ten years and for the last four of these (1945–49) he was Chairman of that Committee. He has served on a number of other scientific councils and government committees, the latest being as Chairman of a group considering the supply of and demand for chemical engineers. He has rendered great service to the University of Bristol and was Pro-Vice-Chancellor from 1940–46 and Acting Vice-Chancellor in 1945; on his retirement he was created an Honorary Fellow of the University. In 1950 he was awarded the C.B.E.

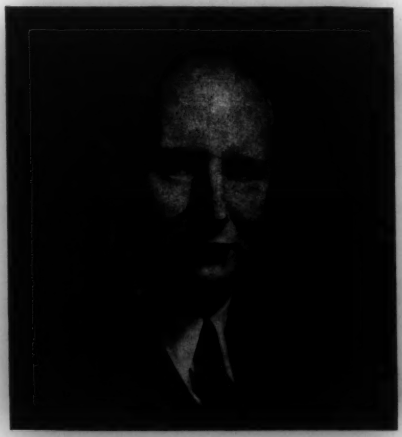
A Founder Fellow of the Institute, Professor Tyndall served on the Board from 1933–36, was elected a Vice-President in 1945 and President for the two succeeding years.

Although now in his seventieth year, Professor Tyndall has a high reputation as a lucid and stimulating lecturer. He delivered the main lecture of the Institute's Buxton Convention in 1949 and a few months ago gave a revised version of this same lecture on atomic particles to the Annual Conference of the Institute's Education Group.



Francis Carter Toy, C.B.E., D.Sc. (*Past President*). A Cornishman, Dr. Toy was educated at Launceston College, Cornwall, and University College, London. Graduating in 1914 and awarded a research scholarship in October of that year, Dr. Toy interrupted his career to join the Services. At the end of the war he obtained the M.Sc. degree of London University and the D.Sc. in 1922, later becoming a Fellow of University College. In 1920 he was appointed Chief Physicist to the British Photographic Research Association and he is the author of some twenty-five original papers on the photographic processes, which have been published in the *Proceedings* of the Royal Society and elsewhere. In 1930 he was appointed Deputy Director of the British Cotton Industry Research Association in Manchester and, in 1944, succeeded the late Sir Robert Pickard as Director of this, one of the largest, Research Association with a total staff of nearly 500. He is a Fellow of the Textile Institute and has taken a close interest in many of the societies in and around Manchester, particularly the famous Manchester Literary and Philosophical Society and the Manchester Statistical Society, of which he is a Vice-President. Among national societies with which he has been associated are the Royal Photographic Society and the Faraday Society, of which he has been Vice-President. He has also served on the National Committee for Physics and the British National Committee for International Photographic Congresses. He is the present Chairman of the Committee of Directors of Research Associations. He was awarded the C.B.E. in 1947.

Dr. Toy was elected a Fellow of the Institute in 1920. His active work for the Institute extends over a long period and, indeed, his service on the Board covers a longer time than that of any other present Fellow except Mr. R. S. Whipple. He served on the Board from 1927–31 and then from 1937–44 as Chairman of the Manchester and District Branch. In 1944, Dr. Toy was elected a Vice-President, and in 1948 succeeded Professor Tyndall as President. He is fifty-nine years of age.

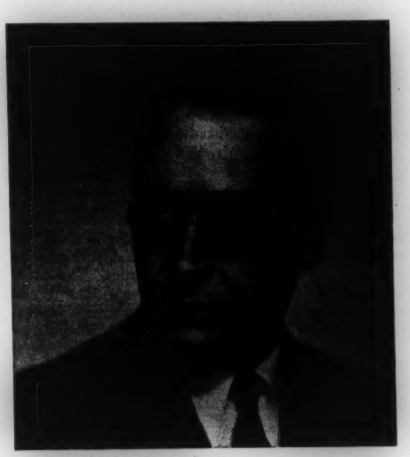


Donald Arthur Oliver, M.Sc. (*Vice-President*). Born in 1906, Mr. Oliver began his research career at the National Physical Laboratory, first (using present titles) in the Ship Division and later in the Electrical Division. From there he moved to the Research Laboratories of the General Electric Company Ltd., where he worked on electro-acoustical problems and the design of permanent magnet systems.

In 1934, Mr. Oliver was appointed to the staff of Wm. Jessop & Sons Ltd., Sheffield, in charge of permanent magnet design; in 1938 he became the Company's first Director of Research and, in 1944, Director of Research to the B.S.A. Group of Companies of which Wm. Jessop & Sons Ltd. was one firm. He has served on a large number of metallurgical committees and is Chairman of the Metal Physics Committee of the British Iron and Steel Research Association and of the Committee on Permanent Magnets of the Electrical Research Association.

Mr. Oliver is a Fellow of the Institution of Metallurgists, President of the Society of Instrument Technology and a Member of Council of the Iron and Steel Institute. He became a Fellow of The Institute of

Physics in 1937, was elected an Ordinary Member of the Board in 1943, and a Vice-President in 1947. He has taken a keen interest in educational matters and since 1946 has been Chairman of the Joint Committee of the Institute and the Ministry of Education for National Certificates in Applied Physics.



Stanley Whitehead, M.A., Ph.D. (*Vice-President*). After graduating in physics at Oxford and spending some time on research under Professor Lindemann (as Lord Cherwell then was), Dr. Whitehead was appointed to the staff of the Electrical Research Association as a Technical Assistant in 1925. At the same time he continued post-graduate work in electrical engineering at Queen Mary College, London.

The whole of Dr. Whitehead's professional career has been in the service of the E.R.A. He was promoted Senior Research Assistant in 1930, Assistant Director in 1938, Acting Director in 1945 and Director in 1946. His personal researches have been mainly concerned with dielectric phenomena and he is the author of four books on the subject and of nearly forty papers in various learned journals.

Dr. Whitehead was elected to Associateship of the Institute in 1928 and transferred to Fellowship in 1934. In 1944 he succeeded Mr. E. R. Davies as Chairman of the London and Home Counties Branch and served on the Board in that capacity until 1949, being elected a Vice-President later that year. He has served the Institute in many capacities and has been a member of almost every Committee of the Board.

Elected to Associate membership of the Institution of Electrical Engineers in 1927 and to Membership in 1937, Dr. Whitehead has served on the Council of that body and has been Chairman of its Measurements Section. He is a Visitor of the Royal Institution, Deputy Chairman of the Management Committee of Science Abstracts, Chairman of some B.S.I. Committees and of the International sub-Committee on Radio Interference and also serves on a number of government and other committees. He is forty-nine years old.

PROCEEDINGS OF THE BOARD

The Board met on January 18th (Mr. D. A. Oliver, Vice-President, in the Chair) and March 15th (Professor W. E. Curtis, President, in the Chair). In addition to formal business and matters referred to elsewhere in the BULLETIN the following items were dealt with:

Panel of Consultants.—It was decided to terminate the present arrangements whereby newly-elected Fellows and Associates are invited to put their names upon the Panel. In future the occasional requests for consultants will be dealt with by the officers in consultation with other senior Members.

1952 *Physics in Industry Conference.*—It was reported that the main Organizing Committee had met in January under the Chairmanship of Sir Andrew McCance. The Committee of the Scottish Branch of the Institute had subsequently been asked, and had agreed, to undertake most of the detailed organization. On the advice of the Scottish Branch the title of the conference which will be held on June 25–28, 1952, would be "Physics in the Shipbuilding, Transport and Engineering Industries."

Graduateship Examination.—The Board approved the final recommendations of the Education Committee for conditions and syllabuses of the Institute's Graduateship examination. (The regulations were published in the May BULLETIN.)

Representatives on other Bodies.—Requests had been received from a number of bodies for the appointment of Institute representatives. The following Members were asked to serve and have accepted:

Norwood Technical College, Governing Body—Mr. M. W. Thring.

East Anglian Regional Advisory Council for Further Education—Mr. H. A. Nancarrow.

London and Home Counties Regional Advisory Council for Higher Technological Education, Advisory Committee on Applied Physics—Mr. F. Y. Poynton, Mr. G. W. Warren, Mr. N. Clarke.

City and Guilds of London Institute, National Joint Body on the Recruitment and Training of Laboratory Technicians—Mr. N. Clarke.

Royal Technical College, Salford, Applied Science Advisory Committee—Mr. D. A. Crooks.

Finance.—The Honorary Treasurer presented the report of the Finance Committee together with the accounts for 1950 for approval by the Board prior to submission to the Annual General Meeting. The Board accepted the Finance Committee's view that it was inadvisable at present to approve any activities, beyond those to which it was already committed, should they involve directly or indirectly additional net expenditure. The Committee reported upon a proposal to allow bona fide students of subjects other than physics to become Subscribers to the Institute at a reduced rate. The Board accepted the recommendation that for a trial period the subscription for such "Student Subscribers" under the age of 21 should be one guinea (the same fee as that charged to Students of the Institute) but that they should not be entitled to any concession in the obtaining of Institute publications beyond that to which all Subscribers are entitled.

The Institute's House.—Proposals of the House Committee to purchase various items for the improvement of the amenities of the House were reported. The cost would be about £200 and would include equipment for the reproduction of gramophone music; the Committee hoped that some members would be willing to make gifts of gramophone records.

Display of Journals.—The Secretary reported that the Institute's *Journal of Scientific Instruments* and *British Journal of Applied Physics* were to be included in the display at the South Bank Exhibition of the Festival of Britain.

Royal Society Fair Copying Declaration.—It was agreed to renew the Institute's agreement to the Declaration regarding Fair Copying on the termination of the present experimental period. The hope was expressed that the Royal Society would endeavour to make the Declaration more widely known among potential users of the scheme which, under certain conditions, permits the copying of papers in scientific journals without the requirement of the formal prior approval of the publisher in each case.

NEWS OF MEMBERS

Fellows

The following have been elected Fellows of the Royal Society:

H. Fröhlich.
K. A. S. Mendelssohn.

The following awards have been made:

Sir Thomas Merton—The Holweck Prize and Medal for 1951 by the Physical Society and the Société Française de Physique.
Sir George Simpson—The 6th Charles Chree Medal and Prize by the Physical Society.

The following Honorary Degrees are to be conferred in June, 1951:

Prof. Sir James Chadwick—Hon. D.Sc. by the University of Birmingham.
Sir J. D. Cockcroft—Hon. LL.D. by the University of Glasgow.

The following professional appointments have been notified:

W. Ehrenberg—University Readership in Physics, Birkbeck College, University of London.

P. A. Wells—Deputy Secretary and Secretary-Elect, Royal Sanitary Institute.

Associates

The following professional appointments have been notified:

W. A. D. Randall—Research Physicist, Joseph Lucas Ltd., Birmingham.

R. V. Tamhankar—Research Metallurgist, Tata Iron and Steel Co. Ltd., India.

"The skilled alchemist achieves the highest results with next to nothing, while the unskilled always attributes his failure to lack of a great store of the newest, most expensive and impressive-looking utensils."

PARACELSUS (c. 1528).

NOTICE TO MEMBERS

Changes of Branch and Group Officers

London and Home Counties Branch.—Dr. H. L. Penman (Fellow) has been succeeded as Honorary Secretary by Mr. B. S. Cooper (Fellow).

Manchester and District Branch.—Professor F. A. Vick (Fellow) has been succeeded as Chairman by Mr. W. J. Meredith (Fellow). Mr. Meredith now joins the Board.

Scottish Branch.—Dr. J. M. A. Lenihan (Fellow) has been succeeded as Honorary Secretary by Mr. J. McNeill (Associate).

Industrial Radiology Group.—Mr. P. Rowbotham (Associate) has been succeeded as one of the Joint Honorary Secretaries by Mr. R. Meakin (Associate).

General Discussion on Heat Transfer

The Institute is one of the many bodies co-operating with the Institution of Mechanical Engineers and the American Society of Mechanical Engineers in the holding of a Conference in London from September 11–13, 1951, on developments in the mechanism of transference of heat and in the design of apparatus relating thereto. Attendance at the Conference will be restricted to members of one of the co-operating institutions and the organizers request that those who may wish to attend should return a preliminary reply form as soon as possible. Copies of this form may be obtained by Members from the Secretary of The Institute of Physics on request.

1951 Radio Convention

The British Institution of Radio Engineers announces details of the programme for the First Session of the 1951 Radio Convention. This is to be held at University College, London, on July 3 and 4, 1951, and the subject is Electronic Instrumentation in Nucleonics. The Second Session (for which details are not available at the time of going to press) is to be held on the two following days on the subject of Valve Technology and Manufacture. Four other Sessions are planned between July 24th and the first week in September and details of all Sessions may be obtained from the Institution at 9 Bedford Square, London, W.C.1.

THE REGISTER

ELECTIONS TO MEMBERSHIP

An asterisk (*) indicates transfer from another grade.

Fellows

Hall, John Ainger, B.Sc., A.R.C.S., Senior Principal Scientific Officer, National Physical Laboratory, Teddington, Middlesex.

Ishaq, Mohomed, M.A., M.Sc., Professor, Pakistan Military Academy.

*Parker, Philip, M.Sc., Senior Lecturer, Physics Department, Northampton Polytechnic, London.

*Stirling, John Foster, B.Sc., Research Physicist, Jas. A. Jobling & Co. Ltd., Sunderland.

*Rajaraman, Sambamurthy, M.Sc., Physicist, Indian Central Cotton Committee, Bombay, India.

Rao, Chebolu Sambasiva, M.A., D.Sc., Assistant Superintendent of Development (Optical), Government of India.

Associates

Bagchi, Nripesh Chandra, M.Sc., Assistant Director, Government Test House, Alipore, India.

Chivers, William Bryan, B.Sc., Senior Physics Master, King Edward VI School, Aston, Birmingham.

Evans, Samuel Islwyn, B.Sc., Ph.D., Lecturer in Department of Fuel Technology, University of Sheffield.

Farnham, John Arthur, B.Sc., Lecturer in Physics, Goldsmiths College, University of London.

*Garwood, Peter, B.Sc., Geophysicist, Oscar Weiss, Johannesburg, South Africa.

Graff, Theodor Hermann Lothar, Doctor Ingenieur, Senior Editoral Assistant, The Institute of Metals, London.

Hawkes, John Crosfield, B.Sc., Group Leader, Research Division, Monsanto Chemicals Ltd., Ruabon, Denbighshire.

*Hutchinson, Edward Stanley, B.Sc., Senior Assistant in Physics, Widnes Municipal College, Lancashire.

Kennedy, Alfred James, B.Sc., Ph.D., Junior Research Fellow, Davy Faraday Laboratory of the Royal Institution, London.

*Morris, Arnold Alec Rudolph Leslie Marshall, B.Sc., Technical Officer, Royal Air Force.

Rumsey, Norman Jack, M.Sc., Physicist, Department of Scientific and Industrial Research, Dominion Physical Laboratory, New Zealand.

Saker, Ernest Walter, B.Sc., Research Student, University of Reading, Berkshire.

Schaefer, Gustav Griffen, B.A., B.Sc., Senior Scientific Officer, Defence Research Laboratories, Maribyrnong, Victoria, Australia.

Shackley, James Halliwell, B.Sc., Chief Science and Applied Mathematics Master, New Mills Grammar School, Stockport.

*Turner, Oliver Harry, M.Sc., Research Student, Clarendon Laboratory, Oxford.

Poupinel de Valence, Edgar Louis Philippe, M.Sc., Assistant Research Officer, S. A. Council for Scientific and Industrial Research, National Physical Laboratories, Pretoria, South Africa.

Wakelin, Richard John, B.Sc., Ph.D., Head of Physics Department, Guest, Keen and Nettlefold Research Laboratories, Wolverhampton.

*Wall, Frederick John Beasley, B.Sc., Physicist, Ilford Ltd., Brentwood, Essex.

The Institute of Physics

Graduates

*Butterworth, James Francis Drury, B.Sc., Research Physicist, British Rayon Research Association.
Campbell, James Gordon, B.Sc., Research Student, University of Melbourne, Australia.
*Clifton, Harold Dennis, B.Sc., Post-Graduate Student Development Engineer, General Electric Co. Ltd., Coventry.
Cornford, Samuel John, B.Sc., Scientific Officer (Physicist), The British Baking Industries' Research Association.
*Evans, John Christopher, B.Sc., Student, University College of Swansea, Glamorganshire.
Fane, Raymond Wyndham, B.Sc., Student, University College, Exeter.
*Garden, Robert Andrew, B.Sc., Assistant Experimental Officer, Meteorological Officer, Air Ministry, Sussex.
Head, Alan Kenneth, B.A., B.Sc., Research Officer, Aeronautical Research Laboratories, Department of Supply, Victoria, Australia.
Hills, John Frank, B.Sc., Refinery Physicist, "Shell" Refining and Marketing Co. Ltd., Cheshire.
Hoare, Peter William, B.Sc., Junior Research Physicist, Henry Simon Ltd., Stockport.
Holt, Arthur Denys, B.Sc., Technical Assistant, Research Department, A. V. Roe Co. Ltd., Manchester.
Hope, Stanley, B.Sc., Refinery Physicist, "Shell" Refining and Marketing Co. Ltd., Cheshire.
Jenkins, Ieuan Huw, B.Sc., Flight Test Observer, Bristol Aeroplane Co. Ltd.
Kelly, John Charles, B.Sc., Technical Officer, Division of Metrology, Commonwealth Scientific Industrial Research Organization, Australia.
Knowles, Brian Geoffrey, B.Sc., D.S.I.R. Research Student, Mining Department, University of Birmingham.
*Lord, Eric Blease, B.Sc., Junior Physicist, Ferranti Ltd., Manchester.
*Mackenzie, Kenneth Ronald, B.Sc., Technical Assistant, War Department, REME, Edinburgh.
*Malkin, Frank, B.Sc., Research Physicist, English Electric Co. Ltd., Stafford.
Marrison, Gerald Joseph, B.Sc., Junior Research Officer, Shirley Institute, British Cotton Industry Research Association, Manchester.
Marshall, Arthur David, B.Sc., Senior Instructor in Physics, Yallourn Technical School, Victoria, Australia.
*Muhley, Gerald, B.Sc., Scientific Officer, British Iron and Steel Research Association.
Nicholson, Kenneth Percival, M.Sc., Research Officer, Commonwealth Scientific and Industrial Research, Australia.
Price, Ronald Eric, B.Sc., Research Student, University of Western Australia.
*Rhoden, Frank, B.Sc., Research Physicist, British Thomson Houston Co., Rugby.
Richmond, Margaret Ann, M.A., B.Sc., Physics Mistress, Mary Datchelor Girls' School, London.
Roberts, Reg John, B.Sc., Lecturer in Physics, Melbourne Technical College, Australia.
Smart, Ernest, B.Sc., Assistant Experimental Officer, Division of Atomic Energy, Ministry of Supply.
Smith, Francis, B.Sc., Research Assistant, Manchester Oil Refinery Ltd.
Thornton, Eric, B.Sc., Physicist, Kodak (Australasia) Pty. Ltd., Victoria, Australia.
*Turner, Alan, B.Sc., Research Trainee, Metropolitan-Vickers Electrical Co. Ltd., Manchester.
Vaux, Laurence James, B.Sc., Lecturer in Physics, Melbourne Technical College, Australia.
Wilson, Raymond Arthur, B.Sc., Senior Physics Master, Lodge School, Barbados, British West Indies.
*Young, Frederick Ronald, B.A., Assistant Master for Physics, Harrow Weald County Grammar School, Middlesex.

Subscribers

Kenedi, Robert M., Senior Lecturer, Department of Civil and Mechanical Engineering, The Royal Technical College, Glasgow.
Lahiri, Birendra Nath, Ordnance Consulting Officer for India, Military Adviser's Department, London.
Phillips, Clarence Alfred George, Inspectorate of Armaments, Ministry of Supply, London.

Students

Berry, D. W., South-East London Technical College.
Bridge, H., University of Durham.
Brown, T. R., West Ham Municipal College, London.
Burns, J. E., Birkbeck College, London.
Clapp, P. G. A., Battersea Polytechnic, London.
Cole, C. G., University of Western Australia.
Coleman, W. M., University of Queensland, Australia.
Compston, W., University of Western Australia.
Culling, J. A., Sir John Cass College, London.
Davis, J., South-East London Technical College.
Ellis, J., University College, London.
Fisher, P., University of Western Australia.
Goodfellow, T. L., University College, University of Durham.
Granville, R. A., University of Leeds.
Harries, J. G., University College of Swansea.
Hogg, H. A. C., Chelsea Polytechnic, London.
Hunter, W. F., University of Western Australia.
Kennedy, W. L., University of Western Australia.
Law, J., University of Birmingham.
Lawrence, A. B., University of Western Australia.
Maslen, V. W., University of Western Australia.
Needham, J., Loughborough College.
Nichols, S., The Technical College, Bradford.
Pothecary, I. J. W., University of Birmingham.
Rampe, B. C., Loughborough College.
Ross, R. I., University of Birmingham.
Samson, J. E., The Polytechnic, Regent Street, London.
Savidge, D. A., Loughborough College.
Scott, K. W., University of Birmingham.
Sewell, P. B., University of Western Australia.
Sherrard, E. I., University of Birmingham.
Taylor, B., The Municipal College, Portsmouth.
Thomas, P., University College of Swansea.

ADDRESSES WANTED

The present addresses or information concerning the whereabouts of the following are required for the Institute's Register. Their last known locations are given in brackets.

Fellow
H. S. Arms (Abingdon, Berks.)

Associates
Prof. M. C. Bathija (Sindh, India).
A. G. Beverstock (Bristol).
H. M. Churches (London).
W. E. Hunt (Beeston, Nottingham).
A. Pelican (London).

Graduate
B. D. Moore (Darley Abbey, Derby).

Subscribers
J. T. Caldwell (Melbourne, Australia).
Miss M. McNeill (Glasgow).
R. H. Russell (Bristol).
C. H. Wan (Cambridge).

Students
D. W. Hills (Manchester).
D. W. Keam (Melbourne, Australia).
B. A. Moys (London).

"Science has its legitimate field and its legitimate methods, although, like the theologian at whom he so often girds, the scientist is not without his prejudices and his narrow dogmatism. He is to be respected when he speaks according to what he knows."

J. W. ROWNTREE.

REPORT ON A SURVEY OF SALARIES AND EMOLUMENTS PAID TO FELLOWS AND ASSOCIATES OF THE INSTITUTE OF PHYSICS, 1951

Approved and adopted by the Board of the Institute on May 17, 1951

PREAMBLE

The following report presents the results of a survey of salaries and other emoluments paid to members of the two grades of corporate membership of the Institute. The results should be read in the light of the requirements imposed by the Institute for such membership.

Fellowship, the senior grade, requires the possession of an honours degree in physics (or, in a small number of cases, alternative evidence of equivalent knowledge) together with at least seven years' experience of original research in the subject or not less than 10 years' experience in some capacity demanding considerable responsibility in a senior technical post. The minimum age for election is 30 years but most successful candidates are older than this.

Associateship requires a knowledge of physics to degree standard and, according to the nature of the degree, a minimum period of approved experience of either three or five years. The minimum age for election is 25 years but there are a small number below that age who were elected when the minimum age was 21. The experience of applicants for Fellowship or Associateship is carefully investigated by the Institute and, therefore, Membership of either of these grades implies not only a standard of scientific knowledge but also a standard of competence in the practice of the profession.

When this survey was made, members of the recently established non-corporate grade of Graduate were also invited to supply data; this information is referred to in an Appendix to the present report.

DATA RECEIVED

The investigation was confined to members living in Great Britain or Northern Ireland and the information supplied relates to salaries in force on January 1, 1951. A similar survey was made three years ago (January 1, 1948) and where possible an indication is given below of changes which appear to have taken place since then.

The response to the enquiry has been very good. From an estimate of the distribution of ages of all members in the grades concerned, it would seem that the return has been substantially the same for members of all ages. The signing of the cards was optional but about 90% of those returned were signed, including those from some of the most distinguished members of the profession. To all who supplied information the Institute is grateful.

Table 1 shows the distribution of the cards returned.

Table 1. *Returns from Fellows and Associates*

Grade	*Sent*	*Returned*	*Percentage*
Fellow	730	446	61
Associate	1 280	894	70
Total	2 010	1 340	67

In addition 180 cards (73%) were received from Graduates.

Table 2. *Broad classification of cards returned by Fellows and Associates*

Age group	21–30		31–40		41–50		51 *and over*		*Total*		
Cards included — *Occupation*	*F.*	*A.*	*F.*	*A.*	*F.*	*A.*	*F.*	*A.*	*F.*	*A.*	*F. + A*
Industry	—	121	44	121	44	28	18	7	106	277	383
Nationalized Industry	—	4	3	4	3	1	—	—	6	9	15
Scientific Civil Service	—	71	26	79	21	20	20	—	67	170	237
Other Government posts	—	8	4	12	9	5	6	—	19	25	44
University (including Medical Schools)	—	83	27	43	45	2	36	—	108	128	236
Technical Colleges	1*	13	9	28	11	23	10	5	31	69	100
Schools	—	5	1	31	4	24	2	6	7	66	73
Research Associations	—	31	18	21	20	1	4	—	42	53	95
Hospitals	—	18	5	11	4	2	—	—	9	31	40
Other Scientific posts	—	3	2	13	3	2	1	—	6	18	24
Total included	1	357	139	363	164	108	97	18	401	846	1 248
Cards excluded	* *Aged* 30.										
Retired									35	8	43
Maintenance grants, etc.									—	16	16
Other reasons									10	24	34
Totals									446	894	1 340

Age and occupational distribution

The broad features of the distribution among age and occupational classes of Fellows and Associates is shown in Table 2.

Members were asked to indicate the nature of the post held. In some cases, ambiguity arose as to the most appropriate group in which the posts should be classified. For example, a number of members on the staffs of the London teaching hospitals indicated that they should more appropriately be classed with University staffs and in the analysis they are so included rather than among hospital physicists. Among the cards excluded are those from regular officers of the Services, those from a few others whose emoluments are fixed upon a basis very different from that of normal civilian posts, and those from holders of fellowships or maintenance grants which are tax free.

It should be remembered that it is not possible to indicate how the present results would have been affected if all members had replied, but it is clear that there would have to be a considerable bias in the remaining results to disturb significantly the broad outlines here presented.

NATURE OF EMOLUMENTS CONSIDERED

In the figure given below, the term "salary" must, in certain groups, be taken to include other emoluments which are normally regarded as appropriate to the post concerned. For example, the additional earnings from examining, consulting or similar sources, which are earned by University staffs have been included in the salaries given. The younger men in the Universities earn very little in this way (few of them more than £50 p.a.), but among the senior men such additional fees are an important part of the emoluments which by custom are considered normal. In one or two cases the extra earnings amount to more than £1 000 p.a. and sums of £200 and above are common; to omit such amounts would give a distorted picture. Most university staffs receive family allowances (usually £50 for each dependent child) in addition to a basic salary; such sums have been included as salary since the report is concerned with actual amounts received by members and not with the methods by which such amounts are determined. The additional sums earned by schoolmasters from examining and evening teaching have been included although this work usually represents a burden not willingly undertaken.

On the other hand, small additional earnings of industrial and other men from such work as part-time lecturing have been omitted.

SALARIES OF FELLOWS

As in 1948, there appears to be no correlation of salary with age among Fellows and the information is therefore presented only in the following classifications. For the purpose of Table 3, Fellows in the Scientific Civil Service and those in other Government posts have been grouped together.

Of the 63 Fellows receiving £2 000 and upwards, 16 receive between £2 500 and £3 000 and 10 upwards of £3 000.

It will be seen that, taking Fellows of all ages, £1 400 p.a. is approximately the median salary. The actual percentage earning more than £1 400 is 53 for Industry, 60 for the Universities, 42 for Government Service and 33 for Research Associations. In view of the different age distributions in the occupational groups and of the limited data, the differences in the percentages for Industry, Government and University may not be significant but the difference between these and the figure for Research Associations is probably significant.

Table 3. *Emoluments of Fellows*

	Age 30–40					*Age over 41*				
Occupational group	*Less than £1 000*	*£1 000–£1 399*	*£1 400–£1 999*	*£2 000 and over*	*Total under 41*	*Under £1 000*	*£1 000–£1 399*	*£1 400–£1 999*	*£2 000 and over*	*Total over 41*
Industry	8	19	12	5	44	6	17	21	18	62
Universities	7	10	5	5	27	5	21	32	23	81
Government	9	12	8	1	30	3	22	26	5	56
Research Associations	9	5	4	—	18	6	8	5	5	24
Technical Colleges	8	1	1	—	10	7	9	4	1	21
Schools	—	1	—	—	1	4	1	1	—	6
Other	2	7	1	—	10	1	4	6	—	11
Total	43	55	31	11	140	32	82	95	52	261
Per cent of age group	31	39	22	7		12	31	36	20	

Fellows: all ages and all occupation groups	*Less than £1 000*	*£1 000–£1 399*	*£1 400–£1 999*	*£2 000 and over*	*Total*
Numbers	75	137	126	63	401
Percentages	19	34	31	16	

Comparison with 1948 *figures*

In Tables 4 (*a*) and 4 (*b*) the 1951 data for the three main occupational classes are grouped in the salary ranges used in the 1948 report. At that time the predominant salary range for Fellows under 41 was £600–£1 200 and for those over 41 was £750–£1 500. Tables 4 (*a*) and 4 (*b*), in which the numbers of cards returned are shown, indicate the changes which have taken place in the main occupational classifications since 1948. It will be seen that there has been a substantial increase in salaries although the number of those in Industry who earn more than £2 000 has not changed significantly.

Table 4 (*a*). *Comparison of* 1948 *and* 1951 *salaries of Fellows up to* 40 *years of age, in the three main occupational groups*

Salary	*Industry*		*Government*		*University*	
	1948	1951	1948	1951	1948	1951
Less than £600	—	—	1	—	2	—
£600–£1 200	42	19	27	20	24	11
£1 200–£1 500	2	12	5	6	2	8
Over £1 500	4	13	—	4	2	8
Total	48	44	33	30	30	27

Taking, as in the 1948 report, the average salaries in the predominant (1948) range of £600–£1 200 we have the following comparison:

	1948	1951
Industry	870	1 015
Government	850	1 010
University	820	935

For younger Fellows in these three groups, there has, therefore, been an increase in the proportion earning more than £1 200 and also an increase of £100–£150 in the average salary of those earning less than £1 200.

Table 4 (*b*). *Comparison of* 1948 *and* 1951 *salaries of Fellows over* 41 *years of age, in the three main occupational groups*

	Industry		*Government*		*University*	
	1948	1951	1948	1951	1948	1951
£750–£1 250	19	17	28	18	19	17
£1 250–£1 500	9	12	12	8	9	19
£1 500–£2 000	6	17	4	26	15	22
Over £2 000	13	15	2	4	6	23
Total	47	61	46	56	49	81

Among the older men the most noticeable change has been in Government service (where the percentage earning upwards of £1 500 has risen from 13 to 53) and in the Universities (where the percentage earning more than £2 000 has gone up from 12 to 28).

Taking now Fellows of all occupational groups (including those not shown in Tables 4 (*a*) and 4 (*b*)), the percentage earning over £1 200 has risen, for those under 41, from 15 to 43 and, for those over 41, from 48 to 67. The percentage earning over £1 500 is now 23 for younger Fellows (it was 6 in 1948) and 45 for the older group (29 in 1948).

SALARIES OF ASSOCIATES

In this grade there is a fairly high correlation of salary with age, as there was in 1948.

Industry (277 *returns*)

This is the largest occupational group. If the average salary in each two-yearly age group is plotted, a curve can be drawn through the data (Figure 1). This indicates a salary of about £500 at 24 and an annual increment of £40 up to the age of about 32, followed by a flattening of the curve to reach a constant salary of rather less than £1 000 just before the age of 40. The dotted lines on Figure 1 indicate salaries 30% above and 30% below the average; nearly 90% of all the industrial returns fall within these limits. Of those falling outside, a number relate to older men earning high salaries and they would probably be eligible for Fellowship if they chose to apply. Only six of the Industrial returns fall below the lower limit curve.

Universities (128 *returns*)

The curve of average salaries for Universities follows closely that of Industry and, on the diagram, would be indistinguishable from it. The number of returns in this group from men over 38 is not sufficient to form a reliable estimate of the higher part of the curve but there is an indication that the steady rise continues further than in Industry. Ten of the University returns lie above the upper limit curve and 5 of these relate to men under 30 years of age. Only 3 University returns are below the lower limit.

Scientific Civil Service (170 *returns*)

The averages for this group lie below those of Industry by about £60 up to about the age of 34 when there appears to be similar evidence of a flattening of the curve to a maximum rather less than in Industry. Five of the returns lie above the higher 30% Industrial limit and 9 of them below the lower limit.

Research Associations (53 *returns*)

In this group the returns would be consistent with a starting salary similar to that in Industry, a smaller rate of increase (£20) up to the age of 30 and thereafter an increment of about £40 continuing as far as data are available (that is, up to about the age of 35). For most of the period between the ages of 27 and 34 the average salary for persons in this group is from £70 to £150 a year below the average for Industry. The salaries of those under 27 years have increased at a greater rate than those of the older men. From the returns only 1 lies above the upper dotted curve on Figure 1 and only 1 below the lower curve.

Technical Colleges (69 *returns*)

The average salaries are not indicated on the diagram but most of the salaries lie well below the Industrial average. Two of the returns are above the upper 30% curve and 13 are below the lower 30% limit.

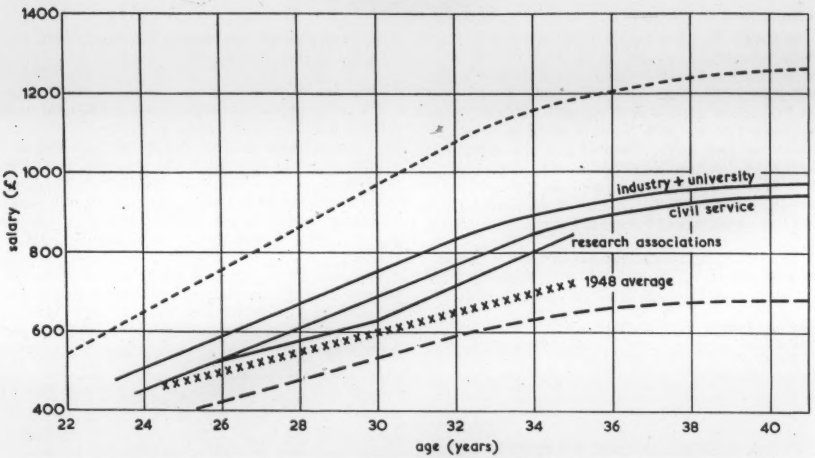


Figure 1.—Average salaries of Associates in main occupational groups showing limits between which approximately 90% of returns from Associates fall

Schools (66 *returns*)

The averages lie slightly above the lower 30% curve. There are 21 returns which are below this limit.

Hospitals (31 *returns*)

This is the smallest group specially considered and there is insufficient data to indicate the variation of salary with age but 25 of the returns are within the upper and lower 30% limits. Of the remaining 6, 5 are above the upper limit, 4 of these relating to men under 30.

All Associates

Taking now the whole of the data for Associates, Table 5 indicates the extent to which salaries fall within the limits indicated in Figure 1 (30% above and 30% below the average salaries of industrial and university posts), and their distribution among the various groups discussed above. Of 846 returns included, 112 fall outside the limits. Of these 112, 57 are above the upper limit and 55 below the lower limit; in this low group 21 are schoolmasters and 13 teachers in technical colleges.

Comparison with 1948 *figures*

In the 1948 report salaries for about 90% of Associates were found to be consistent with a scale of £400 at age 22 rising by annual increments of £25 to £600 at 30 and with limits of $\pm$ 20%. There was then insufficient data to give a reliable indication of the behaviour of such a curve beyond the age of about 36. This earlier scale is shown on Figure 1 and it will be seen that the average of industrial salaries for a given age appears now to be above it by about 20% at age 27 and nearly 30% at age 32 or 34. Starting salaries of men about 23, which had risen rapidly after the war, do not appear to have risen further since 1948 and it is a reasonable deduction that industrial salary scales have more recently readjusted themselves in favour of the men with 5–15 years' experience.

VARIATION IN INDUSTRIAL SALARIES WITHIN AND BETWEEN FIRMS

As most of the cards returned were signed, it was possible to obtain some information about the variation of salaries within individual firms and between firms. For example, groups of Fellows known to be employed in one of two firms (firm "A" and firm "B"), both of which are large industrial organizations employing many physicists and other scientists, were compared. In firm "A" one Fellow (under the age of 40) was receiving a salary considerably above the others, presumably because of administrative responsibility. Excluding this return, the average salary of the Fellows in this firm's employ was £1 520 and the average age 39. The coefficient of variation of salary was 14%. In firm "B" the average salary was £1 225 and the coefficient of variation again 14%; the average age was 44.

Taking Associates in firm "A," the average salary was

Table 5. *Distribution of salaries of 846 Associates*

Key: a = Industry, b = University, c = Civil Service, d = Research Association, e = Technical College, f = Hospital, g = School, h = Others

Salary group \ *Ages*	22 –	26 –	30 –	34 –	38 –	42 –	46 –	50 *and over*	*Total*
Over £2 000				2*a* 1*h*	1*a* 1*c*			2*a*	5*a*, 1*c*, 1*h* = 7 returns
£1 500–£1 999			1*b*	2*a*	1*c*	1*a*	3*a*	2*a*	8*a*, 1*b*, 1*c* = 10 returns
Above + 30% curve: Upper limit—£1 499		2*a* 5*b* 4*f*	5*a* 3*b* 1*c* 1*d*	3*a* 1*c* 2*h*	3*a* 1*b* 1*c* 1*e* 1*f* 1*h*	1*a*	—	2*a* 1*b* 1*e*	16*a*, 10*b*, 3*c*, 1*d*, 2*e*, 5*f*, 3*h* = 40 returns
Below − 30% curve	1*f*	1*c* 4*e* 1*g*	2*a* 1*b* 3*c* 1*d* 2*e* 5*g* 1*h*	2*a* 1*b* 3*c* 1*e* 8*g*	2*a* 1*b* 2*c* 4*e* 4*g*	1*e* 1*g*	1*e* 1*g*	1*g*	6*a*, 3*b*, 9*c*, 1*d*, 13*e*, 1*f*, 21*g*, 1*h* = 55 returns
Totals in Age Groups: *a*	38	65	59	62	28	11	5	9	277
b	19	51	34	12	10	—	1	1	128
c	14	47	49	28	21	8	2	1	170
d	10	18	13	8	3	—	1	—	53
e	1	10	8	8	18	11	5	8	69
f	4	11	9	4	1	2	—	—	31
g	—	3	8	14	19	10	5	7	66
h	2	11	9	17	8	3	2	—	52
Total returns	88	216	189	153	108	45	21	26	846
Totals within 30% limits	87	199	163	127	84	41	16	17	734 = 87%

£1 010 and the average age 33, the coefficient of variation of salary being 13%. In firm "B" the average salary of Associates was £820, the average age 34 and the coefficient of variation of salary 14%. There is therefore evidence (with which the results of other smaller samplings are consistent) that within any organization the salary of an individual may vary by the amount shown above, because of his employer's assessment of his scientific and personal qualities. The remaining variation of about 10% (estimated from the bulk data) among the salaries of Associates in different firms is accounted for by the significantly different standards of the various firms. The two firms referred to as "A" and "B" were chosen simply on the grounds of easy selection from the data available, but there is other evidence to suggest that firm "A" has adopted a salary scale somewhat above the general average.

Further, although it is possible that some younger men may occasionally find greater opportunity and financial recognition in small firms, it should be recorded that there is no evidence in the present data that salaries in smaller firms or firms employing only small numbers of scientists differ appreciably from those in the larger organizations.

ACKNOWLEDGMENT

The Board wishes to record its grateful thanks to the Honorary Secretary, Dr. B. P. Dudding, and the Deputy Secretary, Mr. N. Clarke, who have analysed the data and prepared this report.

APPENDIX

Salaries of Graduates

There were 180 cards returned by Graduates (for which grade the main requirement is a knowledge of physics to degree standard but for which no experience requirement is imposed). Of these cards, 86 were from members in industrial posts, 66 of these senders being between the ages of 23 and 26 years. The average salaries for these ages were somewhat lower (about 10%) than for Associates; the variability was not abnormal.

Of the remaining 94 cards, 28 were from holders of maintenance grants, 21 from those employed by Research Associations, 10 from those in the Civil Service and the remainder mainly from teachers in technical colleges. The data were insufficient for numerical analysis from which significant conclusions could be drawn.

APPOINTMENTS VACANT

The inclusion of particulars of a vacancy must not be taken to imply that the Institute necessarily approves of the terms offered or that might be offered. Candidates should satisfy themselves that these are satisfactory, and they may always refer to the Institute for advice.

Applications are invited for the following posts in the Department of Physics and Mathematics, **College of Technology, Birmingham**:—

Lecturer in Physics. The Department is concerned mainly with Post Graduate courses, External Degrees in Pure Science and Special Physics, and National Certificates in Applied Physics. Research or industrial experience, preferably in electronics is desirable. Salary will be in accordance with the 1951 Burnham (Further Education) Scale for Lecturers (£900×£25 — £1 000 for men, £720×£20 — £800 for women).

Research Assistant in Physics, to work in the field of ultra high frequency electronics. Applicants should have a good Honours Degree in Physics of a University to which a thesis for a higher degree (M.Sc. or Ph.D.) may be submitted on the basis of research work conducted externally. Applicants should also have some knowledge of electronics. The appointment will be for two years in the first instance but may be extended to a third year.

Research Assistants are required to devote some hours weekly in assisting with laboratory supervision.

Salary will be in accordance with the 1951 Burnham (Further Education) Scale for Grade "A" Assistant Teachers (Men: £375 rising by annual increments of £18 and one final increment of £21 to £630. Women: £338 rising by annual increments of £15 and one final increment of £16 to £504), plus graduate and training allowances where applicable. In fixing the commencing salary allowance will be made for teaching and approved industrial experience.

Further particulars and form of application may be obtained by sending a stamped addressed foolscap envelope to the Registrar, College of Technology, Suffolk Street, Birmingham, 1. Completed forms should be returned to him not later than two weeks after the appearance of this notice.

X-Ray Crystallographer required for Metallurgical Research Laboratory in West London Area. The salary will be in accordance with qualifications and experience and in the region of £550–£750. Apply stating age, qualifications, etc., to Box No. A.V.12, The Institute of Physics, 47 Belgrave Square, London, S.W.1.

Physicist required by **The British Iron and Steel Research Association** for research on the design and operation of metallurgical furnaces using model techniques. Candidates should have an interest in the laws of heat transfer and fluid flow, and some knowledge of the similarity principles involved in model techniques.

The research is of considerable importance in developing new ideas regarding metallurgical furnaces. Degree in Physics essential. Age range 23–28. Salary according to age, qualifications and experience. Location of work Sheffield. Post is superannuated under the F.S.S.U.

Written applications only quoting "Furnaces" to Personnel Officer, B.I.S.R.A., 11 Park Lane, W.1.

The National Institute for Research in Dairying, Shinfield, Reading, will have a vacancy from September for a **physicist** to carry out research work on physical (mainly rheological) properties of cheese and other dairy products.

The appointment will be made in the Senior Scientific Officer grade, starting salary £670 for men, £545 for women, with F.S.S.U. benefits. Candidates should have a 1st or 2nd class honours degree in physics with some research experience, preferably rheological.

Applications, giving details of age, qualifications and experience, should be sent to the Secretary, N.I.R.D., quoting reference 51/3.

The Research Association of British Rubber Manufacturers invites applications for the post of **Senior Physicist** in the Association's laboratories. Applicants must have a good Honours Degree in physics preferably with post-graduate research degree and must have had experience in initiation and direction of research projects; previous experience with rubber not essential. Preferred age 30–35. Starting salary within the range £850–£1 050 p.a. according to qualifications; superannuation under F.S.S.U. Applications giving full particulars to be addressed to the Secretary, R.A.B.R.M., 105/107 Lansdowne Road, Croydon, Surrey.

The British Scientific Instrument Research Association invites applications for the newly created post of **Deputy Director of Research.** The Association carries out basic research into problems relating to scientific instruments, the background science being Physics. Well equipped laboratories with a staff of 75 are situated at Chislehurst in Kent. The duties of the Deputy will be mainly those of day-to-day supervision, at the laboratories, of the researches being undertaken in the various departments. The salary will be from £1 500–£2 000 per annum, and the post carries F.S.S.U. superannuation. Applications should be made, within three weeks of the appearance of this notice, to Director of Research, B.S.I.R.A., 20 Queen Anne Street, London, W.1.

Physicist, with some knowledge of vacuum technique, is required for extended research programme on thermionic emission. Applications will be considered for any age between 22 and 30. Salary will depend upon age and experience. Apply in writing to **British Scientific Instrument Research Association,** "Sira," South Hill, Chislehurst, Kent.

Physicist, age between 21 and 26, required for research in Electronics Department. Work includes d.c. amplifiers, photocell appraisal, recording and controlling devices, etc. Applicants should possess a good honours degree or expect to graduate similarly in the near future. Salary will depend on age and experience. Apply in writing to **British Scientific Instrument Research Association,** "Sira," South Hill, Chislehurst, Kent.

Applications are invited by the **Ministry of Works** for two **Scientific Officer** posts (male) in London. At least 2nd Class Honours degree with mathematics or physics as main subject. Alternatively, possession of an Engineering degree with a very strong mathematical background. Experience in characteristics of blast effects would be an advantage but not essential. Duties are to deal with mathematical problems arising from research into Civil Defence fundamentals. Salary £400–£650 p.a., according to age and experience. Applications addressed to the Ministry of Works should be made on forms obtainable from and returnable to the Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting A.148/51/A. Closing date June 25, 1951.

Radiologists required for the X-ray inspection of castings by large founders in S.E. London. Applicants with experience in the interpretation of radiographs of light alloy castings will be preferred. Salary according to qualifications and experience. Write—Personnel Manager, **Messrs. J. Stone & Co. (Charlton) Ltd.,** Woolwich Road, Charlton, London, S.E.7.

DIARY OF INSTITUTE MEETINGS

Members may bring guests to any of the meetings listed below unless otherwise indicated. Individual notification has been or will be sent to the members of the Branch or Group concerned. Other members of the Institute may obtain further particulars from the Secretary of the Institute.

Tuesday, Wednesday, June 19th and 20th (Electron Microscopy Group), **Conference** at the University of St. Andrews.

Saturday, June 30th (Education Group), **Summer Meeting.** A visit to the Physics and Electrical Engineering Department of the **Royal Naval College, Greenwich.**

Friday, Saturday, July 20th and 21st (Education and Electronics Groups). Joint meeting at the **University of Cambridge.** The programme includes visits to the Engineering Laboratories and the Cavendish Laboratory.

Saturday, July 21st (London and Home Counties Branch). A visit to the **Cavendish Laboratory, Cambridge.** The Education and Electronics Groups will also participate.

Monday, Tuesday, Wednesday, July 23rd, 24th and 25th (Industrial Radiology Group) at the Institute's House, 47 Belgrave Square, London, S.W.1. **Summer Meeting and Exhibition.**

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